UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,832	04/09/2004	Rajiv K. Grover	200402482-1	1395

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EXAMINER
CAO, DIEM K

ART UNIT	PAPER NUMBER
2194	

NOTIFICATION DATE	DELIVERY MODE
06/10/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on _06 March 2008_.
2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) _1-26_ is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☐ Claim(s) _____ is/are allowed.
6) ☒ Claim(s) _1-26_ is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a) ☐ All   b) ☐ Some * c) ☐ None of:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____.
      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1.   Claims 1-26 are pending. Applicant has amended claims 1, 6, 8, 11, 18, 20 and 22, and

added claims 24-26.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the
> subject matter which the applicant regards as his invention.

3.   Claims 1-10 and 25-26 are rejected under 35 U.S.C. 112, second paragraph, as being

indefinite for failing to particularly point out and distinctly claim the subject matter which

applicant regards as the invention.

Claims 1 and 6 recite "a computer program product encoding a computer program" with

an intended use for executing a process on a computer system. It is unclear as what is the

computer program product. A reasonable interpretation of the claim would not include the

computer system, thus the claims would be limited to software per se.

Claims 2-5 and 7-10 fail to remedy the remedy the deficiencies of claims 1 and 6 above.

The claims should be amended to make clear that the program product includes both the

computer system and the program.

Claims 25 and 26 recite "wherein device loading is a function of", which is unclear what

is the definition of function. Could it be subtract, addition, divide or something else? Claims

should be amended to make clear what is defined as a function for more consideration.

Claim Rejections - 35 USC § 101

4.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-10 are rejected under 35 U.S.C. 101 because claims 1 and 6 are directed to

computer programs, i.e., software per se, which are not physical "things". They are neither

computer components nor statutory processes, as they are not "acts" being performed. Such

claimed computer programs do not define any structural and functional interrelationships

between the computer program and other claimed elements of a computer which permit the

computer program's functionality to be realized. In contrast, a claimed storage computer-

readable medium encoded with a computer program is a computer element which defines

structural and functional interrelationships between the computer program and the rest of the

computer which permit the computer program's functionality to be realized, and is thus statutory.

Claims 2-5 and 7-10 fail to remedy the deficiencies of claims 1 and 6 above, and

therefore are rejected under the same ground of rejection.

Claim Objections

5.   Claim 15 is objected to because of the following informalities: claim 15 recites to

depend on itself. Appropriate correction is required.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7.   **Claims 1-2, 4, 6-7, 9, 11-14, 16-17, 20-21, 23-24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinton et al. (U.S. 2003/0037187) in view of Tawil (U.S. 6,421,723).**

As to claim 1, Hilton teaches a computer program product encoding a computer program for executing a computer process on a computer system, the computer process comprising:

- identifying a plurality of storage devices to be configured in a storage network (140, Fig. 1 and page 3, paragraphs 23-24);

- identifying a number of host port Logical Unit Numbers (LUNs) which are configured on each of the storage devices (page 3, paragraph 24, lines 1-3);

- identifying a number of host port connections to the storage devices (page 3, paragraph 24, lines 6-11);

- for each port connection, determining actual loading of input/output (IO) jobs for each of the storage devices for each of the LUNs (page 4, paragraphs 26-27 and read requests; page 4, paragraph 31 and obtaining access to the host device access area in the storage device; claim 1, lines 5-6).

Hinton does not explicitly teach that determining the actual loading is based in part of the queue depth. However, Tawil teaches a system in which queue depth is taken into consideration when determining actual loading (abstract, lines 19-21).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to apply the teaching of Tawil to the system of Hinton because Tawil teaches a

method which establishes a storage network configuration to reduce overhead transactions on the

storage network, including overhead associated with target queue full states (col. 2, lines 14-17).

As to claim 2, Hinton teaches determining actual loading for each of the storage devices

based at least in part on a number of host groups in the storage network (page 3, paragraph 24).

As to claim 4, Hinton does not teach teaches using a loading factor to determine if the

actual loading for each of the storage device exceeds a maximum loading. However, Tawil

teaches using a loading factor to determine if the actual loading for each of the storage device

exceeds a maximum loading (col. 2, lines 33-64 and col. 6, lines 13-24).

As to claim 6, Hinton teaches a computer program product encoding a computer program

for executing a computer process on a computer system, the computer process comprising:

identifying a plurality of storage devices to be configured in a storage network (page 3,

paragraph 23);

identifying a number of host port connections to the storage devices (page 3, paragraph

24); and

for each host port connection, determining actual loading for each of the storage devices

(page 4, paragraph 26).

Hinton does not explicitly teach that determining the actual loading is based in part of the queue depth. However, Tawil teaches a system in which queue depth is taken into consideration when determining actual loading (abstract, lines 19-21).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Tawil to the system of Hinton because Tawil teaches a method which establishes a storage network configuration to reduce overhead transactions on the storage network, including overhead associated with target queue full states (col. 2, lines 14-17).

As to claim 7, see rejection of claim 2 above.

As to claim 9, see rejection of claim 4 above.

As to claim 11, Hinton teaches a method providing an input/output (IO) flow control mechanism in a storage network comprising:

- configuring a storage device in the storage network with a plurality of host port Logical Unit Numbers (LUNs) (page 3, paragraph 24);

- automatically determining actual loading for the storage device for each host port LUN (page 4, paragraph 26); and

- accepting the storage device configuration if the actual loading for the device is no more than a maximum loading for the storage device (page 4, paragraph 26).

Hinton does not explicitly teach that identifying a queue depth for each of the host port LUNs, and determining the actual loading is based in part of the queue depth. However, Tawil

teaches a system in which queue depth is taken into consideration when determining actual

loading (abstract, lines 19-21).

It would have been obvious to one of ordinary skill in the art at the time the invention

was made to apply the teaching of Tawil to the system of Hinton because Tawil teaches a

method which establishes a storage network configuration to reduce overhead transactions on the

storage network, including overhead associated with target queue full states (col. 2, lines 14-17).

As to claim 12, Hinton teaches determining actual loading for the storage device is also

based at least in part on a number of host path connected to the storage device (page 3, paragraph

24).

As to claim 13, Hinton teaches determining actual loading for the storage device port is

also based at least in part on a number of LUNs configured for the storage device (page 3,

paragraph 24).

As to claim 14, see rejection of claim 2 above.

As to claim 16, Hinton teaches determining actual loading for a plurality of backend

LUNs connected to the storage device (page 3, paragraph 24).

As to claim 17, Hinton teaches determining actual loading for a plurality of storage

device in the storage network (page 3, paragraph 23).

As to claim 20, Hinton teaches a method of device loading in a storage network, comprising:

configuring the storage network with a plurality of host port connections to at least one storage device (page 3, paragraph 23); and

for each of a plurality of host port connections to the at least one storage device, determining the actual loading of the at least one storage device of each host port connection (page 4, paragraph 26).

Hinton does not explicitly teach determining actual loading of the at least one storage device based at least in part on a queue depth so that the number of input/output (IO) jobs being issued by a host do not exceed the queue depth of a service queue.

However, Tawil teaches a system in which queue depth is taken into consideration when determining actual loading (abstract, lines 19-21), so that the number of input/output (IO) jobs being issued by a host do not exceed the queue depth of a service queue (col. 2, lines 32-64).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of Tawil to the system of Hinton because Tawil teaches a method which establishes a storage network configuration to reduce overhead transactions on the storage network, including overhead associated with target queue full states (col. 2, lines 14-17).

As to claim 21, see rejection of claim 2 above.

As to claims 23-24, see rejections of claims 16-17 above.

As to claim 26, Hinton and Tawil teaches wherein device loading is a function of queue depth for each target port, number of host paths connected to the target port, and queue depth for each host port (see Tawil: col. 5, lines 11-63).

8.   **Claims 3, 5, 8, 10, 15, 18-19, 22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hinton et al. (U.S. 2003/0037187) in view of Tawil (U.S. 6,421,723) further in view of Nahum (U.S. 2004/0078599).**

As to claim 3, Hinton and Tawil do not explicitly teach determining actual loading based at least in part on a number of LUN security groups.

However, Nahum discloses a system in which LUN security groups are used (page 2, paragraph 18).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the teaching of LUN security groups of Nahum's system in Hinton and Tawil's invention because having LUN security groups would allow for greater reliability in assuring that all of the devices were in the storage network legally and not taking into account component that are not part of the network in calculating loading times.

As to claim 5, Nahum teaches the computer process further simplifies host group and LUN security groups into virtual connections for analysis (page 2, paragraph 18).

As to claims 8 and 14, see rejection of claim 3 above.

As to claim 10, see rejection of claim 5 above.

As to claim 18, Nahum further teaches the maximum loading for the storage device based on a loading factor (page 7, paragraph 85). Although Nahum does not teach for test environment it would have been obvious that the system of Nahum can be implemented in the test environment.

As to claim 19, Nahum further teaches the loading factor is in the range of the service queue depth for the storage device (page 7, paragraph 85). Although Nahum does not explicitly teach the range of about 80%-90%, it would have been obvious to one of ordinary skill in the art that the range should not be 100% of the service queue depth, and should not be too low, thus, 80-90% would be a safe choice for the system.

As to claim 22, see rejection of claim 3 above.

As to claim 25, see rejections of claim 26 and 3 above.

Response to Arguments

9.   Applicant's arguments filed 3/6/2008 have been fully considered but they are not persuasive.

In the remarks, Applicant argued in substance that (1) Hinton does not teach determining actual loading of I/O jobs since the teaching of Hinton are directed to determining characteristics of the storage itself, and to not communications between the hosts and the storage system(page 11), (2) there is no motivation to combine the teaching of Tawil to the system of Hinton (page 12), (3) Hinton fails to teach limitations of claims 2 and 4 (page 13), (4) Hinton and Tawil fail to teach "a method providing an input/output (IO) flow control mechanism (page 14), (5) Hinton and Tawil fail to teach the limitation in claim 20 "determining actual loading of the at least one storage device based at least in part on a queue depth of each host port connection so that the number of input/output jobs being issued by a host do not exceed the queue depth of a service queue" (pages 14-15), (6) Nahum does not teach determine actual loading for each of the storage devices based at least in part on a number of LUN security groups in the storage network (page 16 regarding claim 3), and (7) Nahum does not teach the limitations of claims 5 and 18 (page 16).

Examiner respectfully disagrees with the arguments:

- As to the points (1) and (5), those are new limitations and are taught by Hinton in combination with Tawil (see rejections of claims 1 and 20).

- As to the point (2), in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21

USPQ2d 1941 (Fed. Cir. 1992). In this case, Hinton is directed to device loading in a storage

network, and Tawil is directed to configure the storage network to avoid queue full status in the

case of too many requests. It would have been obvious to apply the teaching of Tawil to the

system of Hinton, so the performance of Hinton's system would improve by avoiding the

overhead full queue status.

- As to the points (3) and (7), Applicant failed to provide any reason why the cited

passages do not teach the claims limitations, and therefore are not persuasive.

- As to the point (4), in response to applicant's arguments, the recitation "providing an

input/output (IO) flow control mechanism" has not been given patentable weight because the

recitation occurs in the preamble. A preamble is generally not accorded any patentable weight

where it merely recites the purpose of a process or the intended use of a structure, and where the

body of the claim does not depend on the preamble for completeness but, instead, the process

steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190

USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA

1951).

- As to the point (6), since Hinton in combination with Tawil already teach determining

actual loading based at least in part of LUN, thus, apply the teaching of Nahum regarding LUN

security groups would have been considered by the system of Hinton and Tawil in the process of

determining the actual loading. Therefore, the arguments are not persuasive.

Conclusion

10.   **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the mailing

date of this final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to DIEM K. CAO whose telephone number is (571)272-3760. The

examiner can normally be reached on Monday - Friday, 7:30AM - 3:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng-Ai An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Meng-Ai An/
Supervisory Patent Examiner, Art Unit 2195

DC
June 3, 2008